



University of California

Agriculture and Natural Resources | Cooperative Extension

In This Issue

- Save the Dates
- Non-Trivial Trivia
- Fall Walnut Orchard Management in Lean Times
- Freeze Reminder
- Cover Crop Termination



Submitted by:

Jaime Ott

UCCE Farm Advisor
Tehama, Shasta,
Glenn and Butte
Counties

Non-Trivial Trivia Question:

**What is the single
best way to
prepare for a
sudden autumn
freeze in walnuts?**

Text your response to
Luke Milliron at (530)
828-9666 and you
might just get a
shoutout in the
next newsletter and
at
sacvalleyorchards.com

Late 2024 and Early 2025 Sacramento Valley Orchard Meetings!

Date	Event	Location
Tue Nov 12 9:00 - Noon	2024 Orchard IPM Post-Mortem	Rocco's Banquet Hall (546 Market St in Colusa)
Wed Jan 15 7 AM - Noon	2025 North Valley Nut Conference	Silver Dollar Fairgrounds Chico, CA
Wed Feb 5 8 AM - Noon	Sac-Solano-Yolo Almond Meeting	Woodland
Feb TBD	North Sacramento Valley Prune Day	Red Bluff
Feb TBD	North Sacramento Valley Walnut Day	Red Bluff
Wed Feb 26 8 AM - Noon	Sacramento Valley Pistachio Meeting	Woodland
Wed, Mar 12 8 AM - Noon	Sac-Solano-Yolo Walnut Meeting	Woodland

[Details for events will eventually be posted at: sacvalleyorchards.com/events](http://sacvalleyorchards.com/events)

Walnut Management Considerations – Fall 2024

Clarissa Reyes, Orchard Systems Advisor, Sutter, Yuba, Butte, and Placer Counties

Harvest management considerations to minimize losses by producing the highest quality crop in another low-price year:

Pre-Harvest

Continue to monitor for NOW in walnuts, using pheromone or female traps, as well as visual observations of infestation and egg-laying activity. Watch for fourth flight activity in later harvesting varieties. Consult with your PCA or crop consultant to determine if treatment is needed and economical.

In another low-price year, ethephon may be useful to ensure good nut quality with an early harvest or to minimize production costs with a one-shake harvest. [Monitor packing tissue brown](#) (starting 35 days before your expected harvest date) to time your ethephon application. More details about ethephon use can be found [here](#).

Avoid nitrogen (N) applications in young trees after mid-August, and for mature trees after early September. There is not much N uptake during the fall, and you do not want to stimulate new growth that will be susceptible to freeze injury.

Harvest

Harvest Timing: Harvest as early as possible to reduce quality losses due to navel orangeworm, mold development, and darkening kernel color. Plan to pick nuts up on the same day you shake - walnut quality declines most rapidly during the first 9 hours after shaking.

Collect nut samples at harvest from each orchard block to evaluate the efficacy of your IPM program. Grade sheets don't give the detail you need to determine where damage is coming from. Compare damage in your samples to [this post on Harvest Damage Evaluation for Walnuts](#) to determine how you can improve your IPM program next year.

Set your frost alarms no later than mid-October.

Post-Harvest

Sanitize orchards to remove mummy nuts that harbor overwintering NOW. If you saw high NOW damage in your IPM evaluation, consider poling or shaking remaining nuts out of trees prior to flail mowing. Clean out processing facilities adjacent to orchards.

Prune as early in the fall as possible to avoid new *Botryosphaeria* infections. Avoid making pruning cuts when wet weather is forecasted. When pruning out cankered wood, cut at least 2 inches before the canker margin.

If leaf samples indicated potassium deficiency, consider fall bandings of potassium sulfate or potassium chloride (KCl). Avoid using KCl where there is a perched water table, heavy clay, or less than 8" of winter rainfall because the chloride may not leach out of the root zone before spring leaf-out.

Consider planting a cover crop to help increase water infiltration and prevent ponding in your fields over the winter. [Cover crops in walnut](#) should be seeded before leaf drop for best stand establishment.

Fall weed scouting is part of [integrated weed management](#). It provides the ability to evaluate the current year's weed control program so that adjustments can be made to improve control in the next year. If applying pre-emergent herbicides, blowing or sweeping berms could improve their performance. Another round of scouting after the first autumn rain can inform which winter weed species are present.

If you are removing an orchard in October, paint stumps with a triclopyr herbicide like Garlon, within five minutes of cutting trunks and leave stumps for 60 days. This treatment can kill roots and reduce nematode populations.

Autumn Freeze Damage Strikes Again (2024)

Clarissa Reyes, Orchards Advisor, Sutter-Yuba, Butte, and Placer counties

Luke Milliron, UCCE Farm Advisor Butte, Glenn, and Tehama Counties

Autumn freeze damage in walnuts can occur when trees experience freezing temperatures prior to going into dormancy. In recent history, Sacramento Valley growers experienced this most severely in 2018, and since then, many have implemented management practices to prevent widespread damage.

Symptoms of freeze damage can include:

- Late leaf-out in affected limbs
- Weak or dead terminal budwood and smaller upper limbs (mild/moderate damage)
- Major limb death, mainly in the upper and exposed portions of the tree, and/or apparent whole tree death (severe damage)
- Darkened or orange-tinted wood, with gray/black streaking in the cambium underneath

- Sunburn on damaged limbs, usually on south- and west-facing sides

This past spring (2024), growers in Sutter, Yuba, Yolo, and Tehama counties reported symptoms of freeze damage, likely from an early autumn freeze that occurred near Halloween. If you noticed any of these symptoms in your orchards this past spring or are aware of cold pockets in certain areas/fields, consider the following steps to prevent another year of freeze damage.



Preventative Management:*Tree development:*

1. For young trees, it's best to cut off N applications by mid-August to prevent tender new growth that is most vulnerable to freeze damage. Also, withhold irrigation starting in early to mid-September to set a terminal bud on the trunk (Figure 2). After the terminal bud has set, resume irrigation to avoid tree stress and defoliation, without the fear of pushing tender new growth.

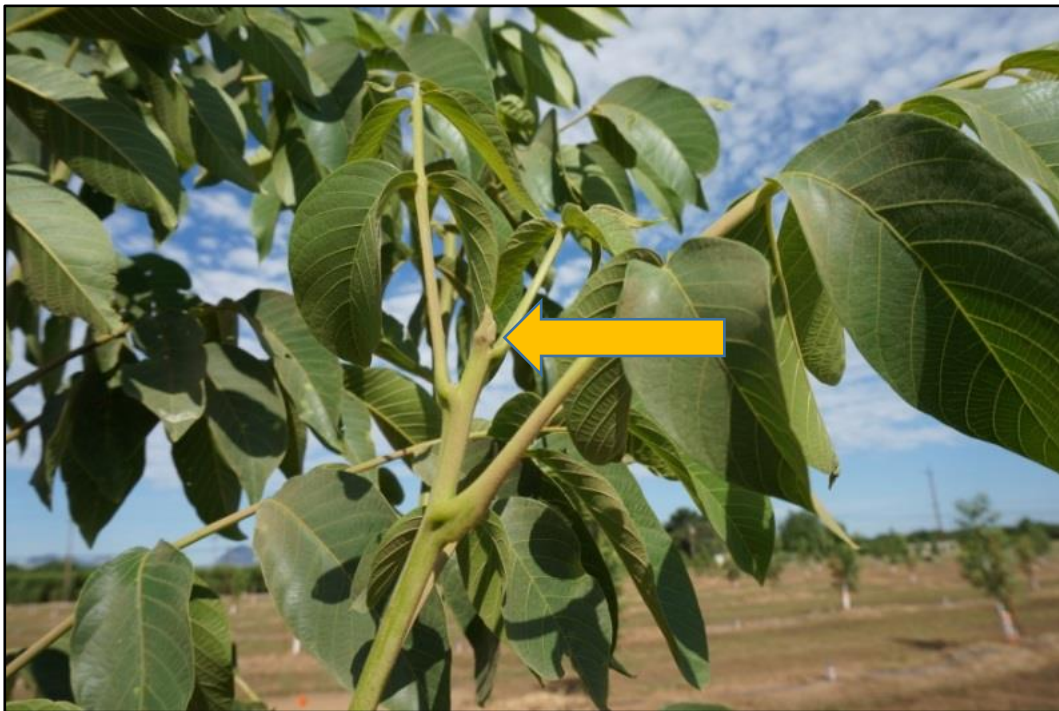


Figure 2. Withhold irrigation until a terminal vegetative bud sets on trunk (Photo Credit: Janine Hasey).

2. For mature trees, cut off nitrogen (N) applications by the beginning of September. Terminal buds may set as a positive side effect of the water cutoff done ahead of harvest to avoid shaker injury.

Increase soil heat storage:

3. Maintain short groundcover during autumn frost season, beginning mid-October. Keeping groundcovers cut to 2 inches or less during frost season allows sunlight to reach the soil surface, increasing soil heat storage for a warmer orchard through the night. Recently cultivated soil has many air spaces, low heat storage capacity, and low heat conductivity resulting in colder minimum temperatures. The ground surface must be moist for bare ground to be the warmest (see steps 4 and 5).
4. Trees that remain water-stressed after the heat of summer are the most vulnerable to autumn and winter freeze damage. If there has not been adequate rainfall by mid-October for young orchards, or immediately after harvest for mature orchards, begin irrigating to refill the soil profile.
5. Water-filled spaces in the soil conduct and store more heat than empty air spaces. Once the soil profile has been refilled, the top several inches of soil are the most important for freeze mitigation and should be kept at field capacity (not saturated/ponding) if possible. Either a dry surface crust on one extreme or a frozen sheet of ponded water on the other extreme will both hinder the re-radiation of stored daytime heat during the night.

6. Continue to actively monitor soil moisture and freeze predictions in November and December (until trees are acclimated to frost – see note below). Since freeze events are variable depending on location, monitoring each block remotely with a freeze alarm makes good sense. If a freeze is predicted and the soil is dry, irrigate to wet the soil 2 to 3 days before a freeze event to fill the air spaces so the soil will store more heat. Light irrigation to moisten a dry soil surface the morning before a freeze will help obtain the greatest heat storage for re-radiation at night (as long as there is no standing water during the freeze event).

Active irrigation during freeze event:

7. Some growers with the ability to actively irrigate during sudden autumn freeze events have reported success in preventing damage. With active irrigation, heat is given off as water converts from liquid to ice. This occurs during the coldest hours of the early morning of the freeze event and is the reason higher flow rates are needed to more successfully manage frost events.
 - We know from work in almonds that active frost protection with solid set irrigation can achieve as much as 4 degrees protection if your system can run 40 gpm/ac.
 - With micro-sprinkler irrigation, 1-2 degrees of warming can be achieved with at least 30 gpm/ac. 25 gpm/ac has been shown to be enough to keep sprinkler heads from freezing.

Painting:

8. In addition to water management, painting young trunks and shoots white can minimize damage if applied as soon as possible after a freeze. Research by UC Walnut Specialist Bruce Lampinen has shown painting after leaf fall with white interior latex paint diluted 50% with water minimizes damage to shoots and buds, especially on the south-west side of the tree. The paint moderates large day-to-night temperature fluctuations after sunny winter days.

Treatment:

If you suspect freeze damage occurred, cut into the branches shortly after a freeze event and check the tissue for drying or browning. Swift action in the week after a freeze event can significantly decrease damage. If you don't paint early, painting trees after a freeze can still help decrease severe damage. Wilbur Reil, Farm Advisor Emeritus, found that when trees were painted a week after a freeze event 18% showed damage, compared with 46% damaged in the unpainted trees. Painting any parts that may be damaged should improve recovery and protect against winter sunburn of affected tissue.

New growth typically occurs below the damaged/dead locations. Dead wood should be pruned out later in the season (mid-summer), after the tree has fully leafed out, to reduce potential colonization sites by Bot or Phomopsis. In young trees with significant freeze damage, remaining limbs or new limbs may have to be trained as new scaffolds.

Potential Causes:

In "normal" years, the combination of short days, gradually dropping fall temperatures, and rainfall pattern allows trees to go into dormancy in a stepwise pattern (2021 and 2022 in Figure 3 below). In years where we've received more reports of autumn freeze damage, there have been large differences in daily high and low temperature (2020), and sudden drops to freezing temperatures prior to trees reaching full dormancy (2020 and 2023).

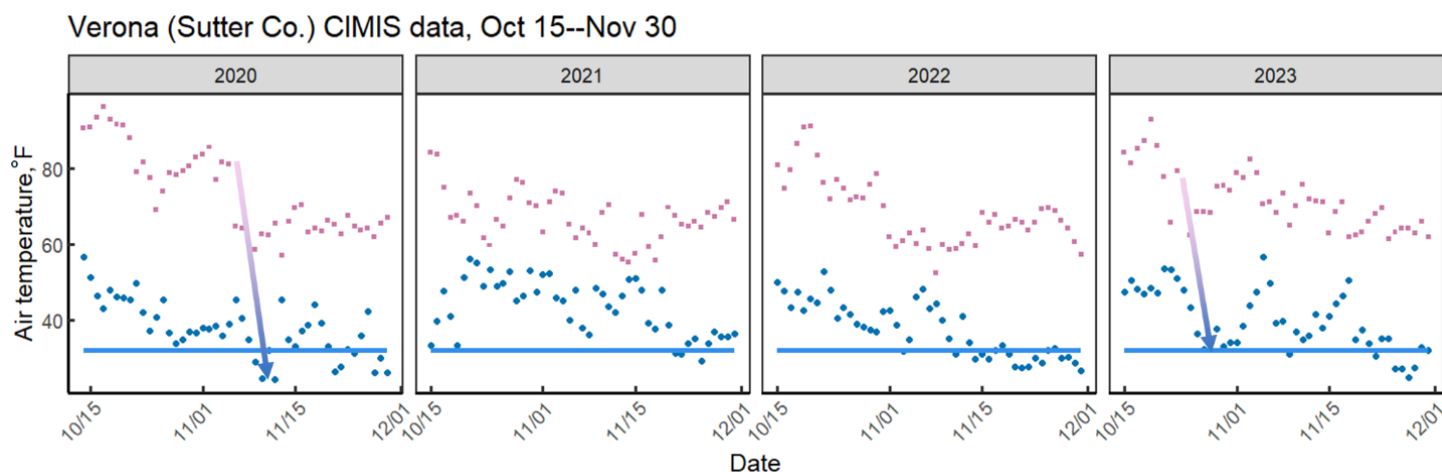


Figure 3. High (pink) and low (blue) temperatures from the Verona CIMIS station in 2020-2023. Arrows indicate drastic drops from high daytime temps to freezing (horizontal blue line) in 2020 and 2023, whereas in 2021 and 2022 the differences between high and low temps are smaller, and low temps reach freezing more gradually.

As temperatures drop into the low 30s °F and days shorten, carbohydrates move from leaves to wood and starch converts to soluble sugars. Slow cooling is needed to promote starch degradation into sugars, which act as “antifreeze” to protect cells from freezing, as does adequate soil moisture, which keeps cells hydrated. When temperatures suddenly and prematurely drop below 32°F before the acclimation process is completed, carbohydrate movement is likely disrupted, and trees are susceptible to freeze damage.

Unfortunately, we do not know how many frost/mild freeze events are required to sufficiently acclimate trees in autumn. So far, growers that were previously hit hard by fall freeze events have reported success in avoiding subsequent freeze damage by having frost alarms ready and turned on by October 15, completely rehydrating trees after harvest, and actively irrigating during freeze events. Eventually, once mature healthy trees are fully dormant, they can tolerate temperatures to the low 20s °F or below.



Roller Crimping – A Cover Crop Termination Option

Becky Wheeler-Dykes, UCCE Farm Advisor, Glenn, Tehama and Colusa Counties

With the end of harvest comes the beginning of winter prep work. One practice that provides a bevy of positive impacts for orchards is planting a winter cover crop. Adding organic matter to the soil via cover crops can improve water infiltration and water holding capacity of the soil. Fixing nitrogen and breaking up compacted soil can also be achieved by selecting appropriate species for your cover crop mix.

While the benefits of winter cover cropping in orchards are well-known, the particulars of when and how to terminate the cover crop can be overwhelming. Using herbicides to terminate a crop can be expensive, and achieving good coverage can be difficult with large amounts of biomass. Mowing or tilling can disrupt the soil, losing some of the accumulated carbon. Annie Edwards and Margaret Smither-Kopperl with the USDA recently released a report on termination using a roller crimper in orchard systems. Their findings show that, while this can be a great tool to maximize the benefits of cover cropping, roller crimping works best with certain cover crop species and growth stages.

Roller crimping is a common practice in other parts of the country but had not yet been studied in California orchard systems. A roller crimper is a drum-shaped implement with blunt curved blades (Figure 1.) that rolls over and crushes down the vegetation without disturbing the roots. This creates a mat of biomass over the soil's surface, similar to mulch. This has been shown to reduce soil temperatures, conserve soil moisture, decrease erosion, and reduce herbicide use. The timing of roller crimping is critical; too early and you won't have enough biomass produced to adequately cover the soil and provide the desired benefits. Too late and the cover crop may have produced seed that can germinate in the current season, depending on irrigation practices and precipitation.



Figure 1. Roller crimper implement. (Photo credit: Tracy Robillard, USDA NRCS.)

Research completed at the USDA's Lockeford Plant Materials Center compared four different cover crop seed mixes to determine how well the roller crimper terminated each. Additionally, each of the four mixes was crimped at 6 different times to evaluate which growth stage was most successful for termination. Data on "bounce back" (when plants stood back up and continued to grow) as well as regrowth, biomass, vegetative stage, and cover crop canopy height were collected.

- Results showed that the **brassica mix** "bounced back" and regrew when roller crimped too early. Termination with the roller crimper was most effective when these species were at least a week into flowering, with termination remaining effective through "seed maturing" stage. This termination timing allowed for good biomass accumulation, and the study notes that the brassica mix formed a vegetative mat when crimped, which is the ultimate goal of this termination technique.
- The **fava beans alone** remained crimped after the plants had visible early pods reaching about 3/16". The fava beans and the brassica mix were the only treatments that were completely successfully terminated with the crimper.
- The **"annual plow down"** mix, consisting of oats, vetch, peas and fava beans, showed best results when crimped at early visible pods in the fava. This mix also had the largest biomass accumulation over the season. However, the oats in the mix had a high rate of "bounce back". Crimping was *not an ideal method of termination* for this mix.
- The **triticale** crop continued to regrow when crimped too early. Crimping was most successful for this species after the plants started to flower. However, even then, the triticale "bounced back" and was *never fully successfully crimped*.

Ultimately, roller crimping is most effective for termination of cover crop mixes without grass species. Crimping brassica mixes and fava beans produces a vegetative mat that can protect soil and maximize the benefits of cover cropping. It is key to use this technique at the appropriate vegetative growth stage for the species in your mix, as crimping too early can necessitate repeating the practice.

The entire USDA report, including seeding densities, seed sources, and photos can be found [here](#).

Up-to-date orchard-related events, news & articles from UC Cooperative Extension farm advisors from the Sacramento Valley.



Scan to visit: sacvalleyorchards.com

*Note, Mention of any chemistries or trade names does not constitute a recommendation and are for informational purposes only. Always consult with your PCA before use and adhere to the pesticide label and local and state regulations.

Richard P. Buchner

UCCE Orchard Crops
Advisor, Tehama
-Emeritus -



The "SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER" is a collaborative effort of research specialists working together to provide Sacramento Valley growers and industry leaders the latest research and information effecting prune production in today's changing environment. This newsletter will be published periodically, be sure to look for upcoming issues!

To simplify information, trade names of products may be used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned. *Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, and County of Tehama, Cooperating.*

ANR NONDISCRIMINATION AND AFFIRMATIVE ACTION POLICY STATEMENT: It is the policy of the University of California (UC) and the UC Division of Agriculture and Natural Resources not to engage in discrimination against or harassment of any person in any of its programs or activities (Complete nondiscrimination policy statement can be found at <http://ucanr.edu/sites/anrstaff/files/169224.pdf>). Inquiries regarding ANR's nondiscrimination policies may be directed to John Sims, Affirmative Action Compliance officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397.